Faculty Of Computers and Artificial Intelligence

Helwan University

Course: Selected Topics In CS -1

FLOWER SPECIES RECOGNITION CREDIT

SVM and ANN Models implemented on image dataset

General information on both image Datasets(ANN and SVM):

Name of dataset used: flowers_data

Number of classes: 30 **Labels of classes:**

alpine sea holly	anthurium	artichoke	azalea	ball moss
balloon flower	barbeton daisy	bearded iris	bee balm	bird of paradise
bishop of llandaff	black-eyed susan	blackberry lily	blanket flower	bolero deep blue
bougainvillea	bromelia	buttercup	californian poppy	camellia
canna lily	canterbury bells	cape flower	carnation	cautleya spicata
clematis	colt's foot	columbine	common dandelion	corn poppy

Total number of samples: 2012 Sample **Number of samples used in:**

Training: 90%

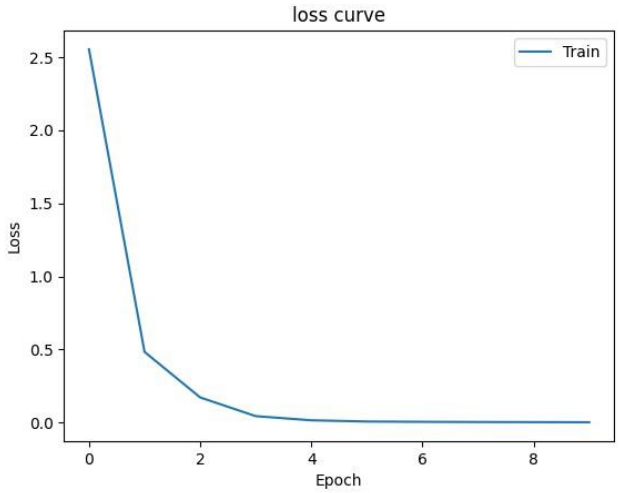
Testing: 10%

A) Implementation details of ANN image dataset:

- **Number of features:** ○ 59310080 (train), ○ 6619136(test)
- **dimensions of resulted features:** ○ test (202, 8, 8, 512) ○ train (1810, 8, 8, 512)
- No cross validation was used
- **Hyperparameters used for ANN model:** ○ loss="sparse_categorical_crossentropy",
    - ○ optimizer="adam", ○ metrics=["accuracy"],
    - ○ hidden layers activation function="relu" , ○ outer layer activation functiom= softmax , epochs=10, ○ validation_data=(features_test, test_y).
- **Hyperparameters used for VGG16 Model (feature extract):**
    - ○ weights='imagenet', ○ include_top=False ○ input_shape=(256,256, 3)

Results details of ANN image dataset:

Loss curve:



Loss values:

[2.5526320934295654,

0.4832943081855774,

0.1722548007965088,

0.044074296951293945,

0.01573716476559639,

0.0073785847052931786,

0.005329321138560772,

0.004016573540866375,

0.0032628190238028765,

0.002611743286252022]

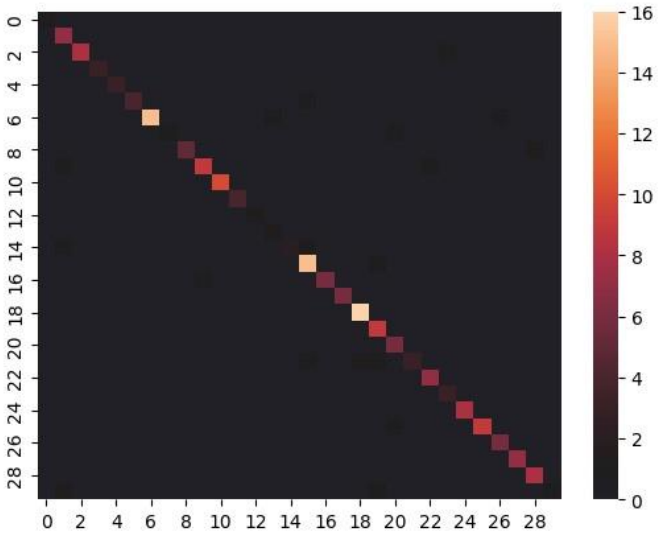
Recall Score: 0.9248513849984439

Precision Score: 0.8916911057352234

f-Score: 0.8871835252524107

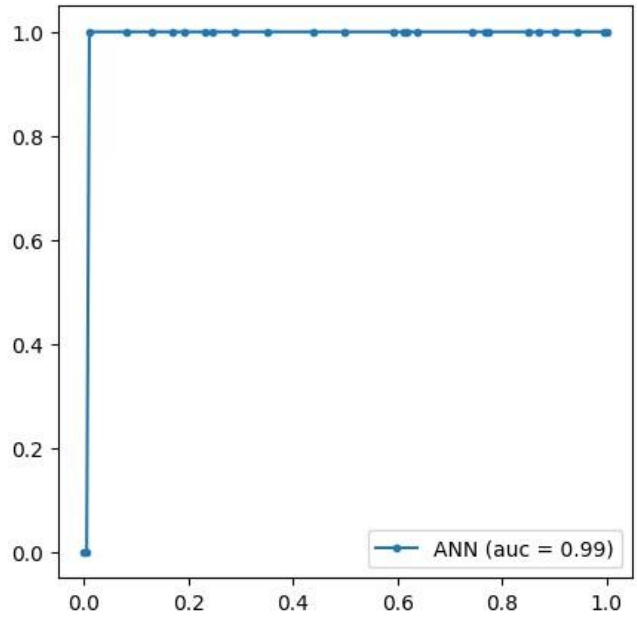
Accuracy Score: 0.9108910891089109

Confusion matrix plot:



AUC Value: 0.9922680412371134

ROC curve:



Implementation details of SVM image dataset:

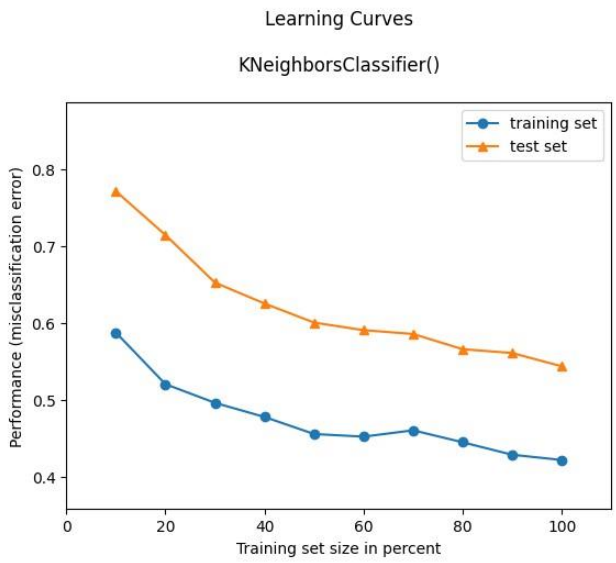
- **Number of features:** ○ 52723712 (train), ○ 13205504(test).
- **dimensions of resulted features:** ○ test (403, 8, 8, 512), ○ train (1609, 8, 8, 512)
- No cross validation was used
- **Hyperparameters used for SVM Model** ○ C=0.5, ○ kernel='linear', ○ degree=3, ○ gamma='auto', ○ shrinking=True, ○ probability=False, ○ tol=0.0001, ○ cache_size=10, ○ class_weight=None, ○ verbose=False, ○ max_iter=-1, ○ decision_function_shape='ovr', ○ random_state =None

- **Hyperparameters used for VGG16 Model (feature extract):**

- weights='imagenet',
- include_top=False
- input_shape=(256,256, 3)

Results details of SVM image dataset:

Learning Curve:



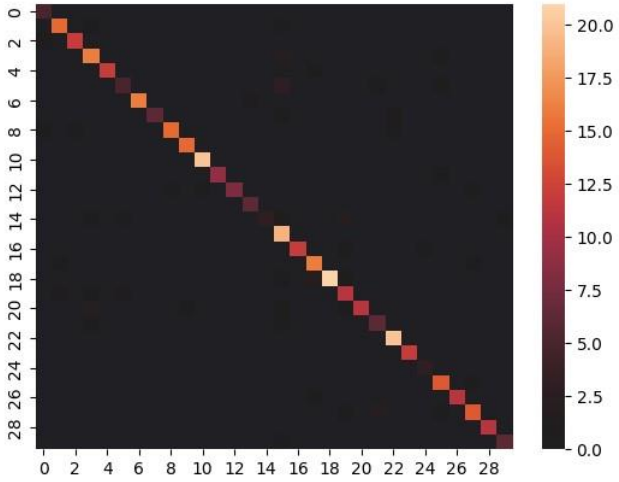
Recall Score: 0.8829989167133381

Precision Score: 0.8616631527227503

F1-Score: 0.8590951623118689

Accuracy Score: 0.8684863523573201

Confusion matrix plot:



AUC Value: 0.9821428571428571

ROC curve: